DUMP TRAILER

BACKGROUND INFORMATION

FIELD OF THE INVENTION

[0001] The invention relates to the field of yard trailers. More particularly, the invention relates to yard trailers that tilt or dump.

DESCRIPTION OF THE PRIOR ART

[0002] The use of small lawn or yard trailers by homeowners and small businesses is quite common. Such trailers are useful for a variety of tasks, such as collecting and hauling away lawn debris or construction materials. The typical lawn trailer is a single-axle trailer that hitches to the back of a tow vehicle. The trailer has a flat bed and three fixed side walls and a removable or openable rear wall. The main disadvantage of the conventional lawn trailer is that it is not tiltable. The material to be hauled in the trailer is generally loaded into and unloaded from the trailer manually. The loading/unloading tasks are time-consuming and are strenuous, often arduous tasks that physically strain the person performing the loading or unloading. Many persons have physical handicaps, such as a bad or weak back, which makes loading or unloading a trailer a painful, if not an impossible, task.

[0003] For these reasons, it is desirable to have a lawn trailer that is tiltable for dumping, thereby eliminating at least the physically strenuous task of unloading. The problem has long been recognized, and a number of solutions have been put forward over the years. The disadvantage of these known solutions is that the sub-structure for dumping the trailer is complicated or extensive, making it either difficult to operate the dumping mechanism or expensive to manufacture. It is also desirable to provide a dumping structure that is retrofittable to an existing conventional lawn trailer.

[0004] A further disadvantage of the conventional lawn trailer is that the forward end slopes downward when it is not hitched to a tow vehicle. There are many uses of a trailer in which it is desirable to maintain the body of the trailer or, at least, the handlebars, horizontal. For example, one may use the body of the trailer or a surface placed across the handlebars as a work surface. A small lawn trailer, for example, could serve a dual purpose as a trailer/wheelbarrow, if it stayed in a horizontal orientation when not hitched to the tow vehicle.

[0005] What is needed, therefore, is a trailer that is dumpable, with only the force of a tow vehicle required to dump the trailer. What is further needed is such a trailer with a dumping means that is easy to use and increases the versatility of the trailer. What is yet further needed is such a dumping means that is retrofittable on a conventional lawn trailer. What is still yet further needed is such a dumping means that maintains an operational horizontal position of the trailer when not connected to the tow vehicle.

BRIEF SUMMARY OF THE INVENTION

[0006] For the reasons cited above, it is an object of the present invention to provide a dump trailer that is brought to the dump position by the force of the tow vehicle. It is a further object to provide such a trailer with a dumping means that is easy to use and improves the versatility of the trailer. It is a yet further object to provide such a dumping mechanism that is retrofittable on a conventional lawn trailer. It is a still yet further object to provide such a dumping means that holds the trailer in its operational horizontal position when not connected to the tow vehicle.

[0007] The objects of the invention are achieved by providing a trailer having a modified a tow bar assembly that is pivotably attached to the front end of the trailer body of a trailer. To bring the trailer to the dump position, the tow bar assembly is hitched to the tow vehicle and the trailer wheels blocked or locked from rolling backward. When

the tow vehicle is backed up toward the trailer, the tow bar assembly pivots relative to the trailer body, thereby pushing up the front end of the trailer body to the dump position. When the tow vehicle is driven forward, the increasing distance between tow vehicle and dump trailer pulls the front end of the trailer body down to its operational horizontal position. The term "operational horizontal position" refers to the position of the trailer body when the trailer bed is parallel with the ground surface.

[0008] The dump trailer according to the invention comprises a trailer body mounted on a single axle with a pair of wheels and a tow bar assembly according to the invention. The tow bar assembly includes a tow bar and an extension bar, which are provided with adjustment holes at their respective tow ends for adjustably setting the overall length of the tow bar assembly. A tow coupler means is attached to the tow hitch end of the extension bar for coupling the tow bar assembly with the tow hitch on the tow vehicle. Some means of preventing the trailer wheels from rolling backward during the dump operation are needed. A wheel chock or wheel brakes, such as electrical, mechanical, hydraulic brakes, may be used to block or lock the trailer wheels.

[0009] The dump trailer according to the invention includes several optional features, such as an auxiliary wheel and/or a work surface. The auxiliary wheel is provided to maintain the dump trailer in it operational horizontal position when it is not hitched to the tow vehicle. The auxiliary wheel assembly includes a wheel-assembly bar that is rotatable between a functional position and a non-functional position. In the functional position, the wheel is suspended downward from the wheel-assembly bar and comes into contact with the ground surface, in which position it maintains the dump trailer in a horiziontal orientation. In the non-functional position, the auxiliary wheel is swung upward, so that it is out of the way when the dump trailer is being towed. If the auxiliary wheel is included in the tow bar assembly, the extension bar is slidingly mounted in the wheel-assembly bar. When the wheel assembly is brought into the functional position, the tow coupler means on the extension bar is facing toward the trailer body and

prevents hitching the dump trailer to the tow vehicle; when in the non-functional position, the tow coupler means is facing away from the trailer body and allows hitching of the dump trailer to the tow vehicle.

[0010] A further optional feature of the dump trailer according to the invention is a work surface that is mounted or provided on the handlebars of the trailer. A lawn trailer is often used for garden work, and it is very convenient to have a substantially flat surface at a comfortable working height for performing certain tasks. The work surface may be provided in several embodiments. In one, it is a flat tray with very short sidewalls and is fixedly attached to the handlebars. In another, the work surface is a flat container with side walls and the bottom of the work surface is formed so that the container is securely seated atop and/or between the handlebars.

[0011] It is within the scope of the invention to provide alternative embodiments of the dump trailer. The unifying feature of all these embodiments is that the tow bar assembly for bringing the trailer body into the dump position is pivotably mounted on the front face of the trailer body. One alternative embodiment includes a tow bar assembly that allows the use of a conventional ball-hitch. The tow bar assembly includes a telescoping tow bar and a fixed-length push bar assembly. In this case, the telescoping tow bar must remain horizontal throughout the dumping process. The fixed-length push bar assembly is a forked bar that is pivotably attached at one end to two points on the front face of the trailer and at the other end to the tow-hitch end of the telescoping tow bar. The tow-hitch end of the telescoping bar has a ball-coupler for coupling with the ball hitch; the other end of the telescoping tow bar is attached to the bottom of the trailer body, some distance behind the single axle. The wheels are blocked from rolling backward and as the tow vehicle backs up and the telescoping tow bar becomes shorter in length, the fixed-length push bar assembly forces the front end of the trailer body up, bringing the trailer to the dump position.

[0012] In a second alternative embodiment of the dump trailer according to the invention, a tilt control means is provided that will allow the trailer to be locked into a desired tilt angle. The tow bar assembly of this embodiment includes a set of dual push bars, each bar pivotably attached to an upper front corner of the trailer body. The tilt-control means comprises a pair of plates mounted on the tow bar assembly and a plate-locking mechanism. One plate is mounted at the top of each push bar such that the plate, when the orientation of the push bar changes to a more vertical position, the plate moves backward alongside the side wall of the trailer body. A series of locking holes is provided on the perimeter of the tilt-control plates. The plate-locking mechanism allows the two plates to be locked into a particular position, thereby holding the trailer in a particular tilt. The tow bar assembly must be pivotably hitchable to the tow hitch on the tow vehicle. Thus, a pintle coupler, with pintle hook and eye, is a suitable tow-coupler means for this embodiment, because it allows the angle of the dual push bars to change with regard to the vertical as the dump trailer is brought to the dump position.

[0013] A further feature of the dump trailer according to the invention is an elevating sub-structure that raises the trailer body to an elevated height that is higher than its normal distance from the axle. The advantage of raising a trailer body to this elevated height is that, particularly with larger trailer bodies, it allows the dump trailer to be brought to a steeper dump angle without the rear end of the dump trailer hitting the ground. The elevating sub-structure is mounted on the axle and, by means of a collapsing rod configuration, raises or lowers the trailer body.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The present invention is described with reference to the accompanying drawings. In the drawings, like reference numbers indicate identical or functionally similar elements. Drawings are not drawn to scale.

[0015] **FIG. 1** is a side view of the dump trailer according to the invention, shown in its operational horizontal position, supported by the auxiliary wheel.

[0016] **FIG. 2** is a side view of the dump trailer of **FIG. 1**, shown in its dump position.

[0017] **FIG. 3** is a top view of the dump trailer of **FIG. 1**.

[0018] **FIG. 4** is a side view of a modified dump trailer that include a work surface mounted on the handlebars.

[0019] **FIG. 5A** is an illustration of a modified tow bar assembly, with an extension bar, but without the auxiliary wheel.

[0020] **FIG. 5B** is a top view of the modified tow bar assembly of **FIG. 5A**.

[0021] **FIG. 6** is a side view of a first alternative embodiment of the dump trailer according to the invention, shown in the dump position.

[0022] **FIG. 7** is a side view of the dump trailer of **FIG. 6**, shown in the dump position.

[0023] **FIG. 8** is a top view of the dump trailer of **FIG. 6**.

[0024] **FIG. 9A** is an illustration of the tilt-locking bar, shown locking the tilt plates in a particular position.

[0025] **FIG. 9B** is an illustration of the tilt-locking bar, shown in a released state, allowing the tilt plates to pivot about their pivot anchor.

[0026] **FIG. 10** is a side view of a second alternative embodiment of the dump trailer according to the invention, shown in the dump position.

[0027] **FIG. 11** is a side view of the third embodiment of the dump trailer of **FIG. 10**, shown in the tow position.

[0028] **FIG. 12** is a side view of an elevated trailer according to the invention, showing the elevating sub-structure in its fully extended position.

[0029] **FIG. 13** is a side view of the trailer of **FIG. 12**, showing the elevating sub-structure in it collapsed state.

[0030] **FIG. 14A** is a partial frontal view of the trailer if **FIG. 12**, showing the front elements of the elevating sub-structurein its deployed state.

[0031] **FIG. 14B** is a partial frontal view of the trailer of **FIG. 12**, showing the front elements of the elevating sub-structure in a collapsed state.

[0032] **FIG. 15A** is a partial rear view of the trailer of **FIG. 12**, showing the rear elements of the elevating sub-structurein its deployed state.

[0033] **FIG. 15B** is a partial rear view of the trailer of **FIG. 12B**, showing the rear elements of the elevating sub-structure in its collapsed state.

[0034] **FIG. 16** illustrates a capture means for securing the sliding rail in a groove and a locking means for locking the sliding rail in a particular orientation.

DETAILED DESCRIPTION OF THE INVENTION

[0035] Several embodiments of the dump trailer according to the invention are described below. The underlying principle of all the embodiments of the dump trailer is that the trailer is raised to a dump position from its operational horizontal position simply by using the power of a tow vehicle **T**. The tow vehicle **T** is shown in these illustrations generally as the rear end of a pickup truck or a lawn tractor, but it shall be understood that the tow vehicle may be any suitable vehicle, including, but not limited to, a passenger automobile, a truck, a recreational vehicle, such as a four-wheeler, a riding lawn mower, and a tractor. The trailers described hereinafter include a trailer body with

two side walls, a front wall, and a rear wall. The trailer body is symmetrical about a longitudinal axis that extends from a front end **F** to a rear end **R**, with two wheels **W** mounted on the ends of a single axle **A**, and a tow bar according to the invention. The shape of the trailer body is not necessarily rectangular, however, in that the rear end **R** of the trailer body may be wider than the front end **F**. The front end **F** is a general designation that encompasses the area of the front wall, as well as the areas of the side walls and the trailer bottom that are close to the front wall. Similarly, the rear end **R** includes the area of the rear wall, as well as the areas of the side walls and trailer bottom that are close to the rear wall. The tow bar is pivotably attached to the front end **F** of the trailer body and, by first blocking or locking the wheels of the trailer to prevent them from rolling backward, the trailer is raised to the dump position by backing the tow vehicle **T** toward the dump trailer. With the tow vehicle **T** moving toward the trailer, the tow bar forces the front end **F** of the trailer up, bringing the trailer body to the dump position. Driving the tow vehicle **T** forward automatically restores the trailer to its operational horizontal position.

[0036] **FIGS. 1 – 3** illustrate a preferred embodiment of a dump trailer **100** according to the invention. **FIGS. 1** and **3** show the dump trailer **100** in its operational horizontal position, while **FIG. 2** shows the dump trailer is its dump position. The dump trailer **100** comprises a trailer body **110**, a trailer handle **120**, and a tow bar assembly **200**. The preferred embodiment also includes an auxiliary wheel assembly **300**. The tow bar assembly **200** includes a dual bar **201** and is rigidly attached to the trailer body **100** by a pivot attachment means **210**. In the embodiment shown, the pivot attachment means **210** includes a bracket **204** that is securely attached to the front end **F** of the trailer body **110** by a hinge **210**. The dual-bar tow bar **201** comprises a first bar **201A** and a second bar **201B**, best seen in **FIG. 3**. The first and second bars are **201A/201B** mirror images of each other and extend forward from the trailer body **110** and terminate at a forward end **201C** of the dual bar **201**. A tow coupler means **240** is used to hitch the dump trailer **100** to the tow vehicle **T**. The tow coupler means **240** shown in the preferred

embodiment is a pair of connector plates **242**, pivotably joined by a hinge **244**. As shown in **FIG. 2**, when hitched to the tow vehicle **T**, a safety pin **246** is used to secure the connector plates **242** to the two hitch of the tow vehicle **T**.

[0037] The auxiliary wheel assembly **300** is rotatably mounted at the forward end **201C** of the dual bar **201**. The purpose of the auxiliary wheel assembly **300** is to maintain the dump trailer **100** in a horizontal orientation when it is not hitched to the tow vehicle **T**, allowing the dump trailer **100** to be used similar to a conventional three-wheeled wheelbarrow, as illustrated in **FIG. 2**. The auxiliary wheel assembly includes a wheel **330** that is freely rotatable about a vertical axis and that is mounted on a rigid curved bar **301**. The curved bar **301** is captured between the first and second bars **201A,201B** by means of a pin that extends through bores in the first and second bars **201A,201B** and the curved bar **301**, thereby allowing the curved bar **301** to rotate about the pin from a non-functional position, shown in **FIG. 1**, to a functional position shown in **FIG. 2**. In the functional position, the wheel assembly **300** is rotated down, with the wheel **330** extending down and supporting the forward end **201C** of the tow bar assembly **200**. In the non-functional position, the auxiliary wheel assembly **300** is rotated so that the wheel **330** extends upward away. Note that the tow coupler means **240** is connected to the end of the curved bar **301** such that the wheel assembly **300** is prevented from remaining in the functional position when the dump trailer **100** is hitched to the tow vehicle **T**.

[0038] With continued reference to **FIGS. 1 – 3**, an extension bar **220** is slidingly inserted into an end of the curved bar **301**. Both the curved bar **301** and the extension bar **220** have extension holes **201D**, for adjusting the length of the extension bar **220**. This allows the distance between the dump trailer **100** to be shortened to a minimum when it is being towed by the tow vehicle **T** and easily and quickly extended when preparing the dump trailer **100** for dumping. Extending the tow bar assembly **200** by

means of the extension bar **220** permits the dump trailer **100** to be moved to a greater tilt during the dumping process.

[0039] **FIG. 4** illustrates a work surface **400** that is supported by the handlebars **120**. The work surface **400** is an optional accessory for the dump trailer **100** according to the invention and is not limiting in the scope of the invention. The work surface **400**, in the embodiment shown, is a flat, shallow tray that is fixedly mounted on the handlebars **120**. Depending on the intended routine use for the dump trailer **100**, it is, of course, possible to provide a container with higher side walls, or to provide a tray that is shaped on the bottom so as to be seatable on the handlebars **120** without being permanently attached to the handlebars **120**. An additional optional feature of the dump trailer **100** shown in **FIG. 4** is the raised handlebars **120**. The attachment of the handlebars **120** to the trailer body **110** has been modified to raise the horizontal level of the handlebars **120** to a height that provides a more comfortable work surface height. In the embodiment shown, the modification is achieved by adding an S-shaped attachment bar **410**.

[0040] **FIGS. 5A** and **5B** illustrate an alternative tow bar assembly **200'** in which the extension bar **220** is slidingly inserted into a receiver bar **222**. The receiver bar **222** is fixedly mounted between the forward end **201C** of the dual bars **201A, 201B**. Both the receiver bar **222** and the extension bar **220** have tow-bar adjustment holes **201D**. The overall length of the tow bar assembly **200** is adjusted by sliding the extension bar **220** out of the receiver bar **222** to the desired length and securing the extension bar **220** to the receiver bar **222** by passing a locking pin **201 E** through the tow-bar adjustment holes **201D**.

[0041] **FIGS. 6** and **7** illustrate a first alternative embodiment of a dump trailer **1100** according to the invention, shown hitched to the tow vehicle **T**. The dump trailer **1100** may be a conventional or customized trailer with an undercarriage support that allows the trailer body to pivot about the single axle **A**. **FIG. 6** shows the dump trailer **1100** in a dump position and **FIG. 7** shows it in a tow position. The dump trailer **1100** comprises a

frame **1110**, trailer walls **1101**, a tow bar assembly **1200**, and, in this embodiment, a tilt-control means **1300**. The trailer walls **1101** include right and left side walls **1101S**. In this embodiment, the dump trailer **1100** is hitched to the tow vehicle **T** by means of a conventional pintle coupler **P** having a pintle hook **P1** and an eye **P2**.

[0042] **FIG. 8** illustrates the configuration of the tow bar assembly **1200**, which includes two lower bars **1226** that converge at a hitch end **1225**, and two upper bars **1223** that extend parallel to the sidewalls **1101S**. The upper bars **1223** are each pivotably connected to the front end **F** of the frame **1110** by a pivot attachment means **1220**, indicated generally by a pivot anchor **1224** and are rigidly connected at the other end to the respective lower bars **1226**. The tilt-control means **1300** are mounted on the upper bars **1223** of the tow bar assembly **1200**. The position of the tilt-control means **1300** varies with the degree of tilt of the dump trailer **1100**, as best seen in **FIGS. 6** and **7**. In this **FIG. 8**, the dump trailer **1100** is in the tow position and a portion of the tilt-control means **1300** is visible on each side of the dump trailer **1100**.

[0043] **FIGS. 9A** and **9B** illustrate a tilt-locking assembly **1400** that is used to lock the tilt-control means **1300** to secure a particular degree of tilt of the dump trailer **1200**. The tilt-locking assembly **1400** comprises a first locking bar **1430** and a second locking bar **1440** that are pivotably mounted on a pivot strap **1420**. The pivot strap **1420** is rotatably mounted on the frame **1110**. Locking-bar guides **1424** are also provided on the frame **1110**, one on each side of the dump trailer **1100**. A lever **1422** is used to move the tilt-locking assembly **1400** from a locking position, shown in **FIG. 9A**, to a released position, shown in **FIG. 9B**. The tilt-control means **1300** comprises a pair of tilt-control plates **1310**, one mounted on each side of the dump trailer **1100** at the upper end of the tow bar assembly **1200**. As illustrated in **FIGS. 6** and **7**, the tilt-control plates **1310** are fixedly connected to the respective upper bars **1223** and, as the tow bar assembly **1200** pivots about the pivot anchors **1224** and changes from a tow position, shown in **FIG. 7**, to a dump position, shown in **FIG. 6**, the tilt-control plates **1310** swing along side and

parallel to the body of the dump trailer **1100**. Holes **1312** are provided along the perimeter of the tilt-control plates **1310** for receiving the ends **1431** and **1441**, respectively, of the first locking bar **1430** and the second locking bar **1440**. The locking bar guides **1424** are provided in close proximity to the edge of the frame **1110** to capture the locking bars **1430/1440** and hold them properly aligned as they are shifted between the locking and release positions.

[0044] Operation of the first alternative embodiment of the dump trailer **1100** according to the invention is as follows: The dump trailer **1100** is connected to the pintle **P1** of the pintle coupler on the tow vehicle **T** by means of the eye **P2** on the hitch end **1225** of the tow bar assembly **1200**. The tow bar assembly **1200** is a rigid assembly and, as the tow vehicle **T** moves forward, the dump trailer **1100** is pulled along. To bring the dump trailer **1100** to a dump position, the wheels **W** of the dump trailer are blocked from rolling rearward. A wheel chock **C** is shown in **FIG. 11** for reasons of simplicity in illustration, but it is understood that the dump trailer **1100** may just as well be equipped with electrical, mechanical, or hydraulic brakes that are actuated from the tow vehicle **T**. The tilt-locking assembly **1400** is released, so that the tilt-control plates **1310** are free to swing as the tow bar assembly **1200** changes in tilt orientation. With the wheels of the trailer blocked, the tow vehicle **T** now simply backs up toward the dump trailer **1100**. The pivot means **1220** allows the upper end of the tow bar assembly **1200** to pivot, thereby changing the angle of the tow bar assembly **1200** to a more vertical orientation to accommodate the shortening distance between the tow vehicle **T** and the dump trailer **1100**. This forces the body of the dump trailer **1100** to pivot about its axle, effectively raising the front end **F** and lowering the rear end **R** of the dump trailer **1100**. When the dump position is no longer required, the tow vehicle **T** is simply moved forward. The tow bar assembly **1200** is pulled to a more horizontal orientation, thereby pulling the front end **F** of the dump trailer **1100** down to its normal position.

[0045] **FIGS. 10** and **11** illustrate a third embodiment of a dump trailer **1800** according to the invention. dump trailer **1800** embodies a simple construction that is particularly suited when the tow vehicle **T** is equipped with a ball hitch **B**. The configuration of the ball hitch **B** requires that the hitch on the trailer remain horizontal. The dump trailer **1800** is a conventional trailer that has been modified to function as a dump trailer. A tow bar assembly **1810** includes a telescoping tow bar **1830** comprising a first bar **1832** and a second bar **1834**. The two bars **1832/1834** are dimensioned such that the second bar **1834** is slidably insertable within the first bar **1832**. One end of the telescoping tow bar **1830** is hitched to the ball hitch **B** on the tow vehicle **T**; the other end is fixedly attached to a point on the underside of the trailer. Connected to the telescoping tow bar **1830** is a tilt means **1820** that is pivotably attached at one end to the tow bar **1830** and pivotably attached at the other end via a pivot anchor **1824** to the body of the dump trailer **1800**. In the embodiment shown, the tilt means **1820** includes two push rods **1822** and **1823** that are fixed in a V-shaped configuration.

[0046] To move the dump trailer **1800** into the dump position, the wheels **W** are prevented from rolling rearward by some suitable means. In the illustration shown, wheel chocks **C** are placed behind the wheels **W**, although it is understood, that other conventional means of applying brakes to the wheels, such as mechanical, electrical, or hydraulic brakes that are actuated from the tow vehicle **T,** are included within the scope of the invention. A safety lock **1836**, shown in **FIG. 14**, is used to secure the length of the telescoping tow bar **630** when the dump trailer **1800** is not being used for dumping. This safety lock **1836** is removed to release the telescoping function of the tow bar **1830**. The tow vehicle **T** backs up toward the dump trailer **1800**. The force against the tow bar assembly **1810** forces the first tow bar **1832** to slide over the second tow bar **1834**, thereby shortening the distance between the tow vehicle **T** and the dump trailer **1800**. The tilt means **1820**, being pivotably mounted on the tow bar **1830** and the body of the dump trailer **1800** is forced to a more vertical orientation. This effectively raises the front end **F** and lowers the rear end **R** of the dump trailer **1800**, as shown in **FIG. 13**.

[0047] **FIGS. 12 - 16** illustrate a height-adjustable trailer **2000**. The utility of the elevation sub-structure **2200** is to elevate the body of the height-adjustable trailer **2000**, so that it may be tilted to a 45 degree angle, to facilitate the removal of material during dumping. The elevation sub-structure **2200** is generally not required for use with the small lawn trailer. A conventional trailer with a body 8 feet or longer normally cannot be tilted to a 45-degree angle because the rear end of the trailer body hits the ground at a lesser angle. The 45-degree angle is the optimum angle for dumping, however, and the elevation sub-structure **2200** according to the invention allows an operator to raise the trailer body above the axle structure so that, when dumped, the rear end of the trailer hits the ground when the body is tilted approximately 45-degrees.

[0048] The height-adjustable trailer **2000** shown in **FIGS. 12 – 16** is the dump trailer **100** of **FIGS. 1-3** above, but it is understood that the elevation sub-structure **2000** may be provided with any conventional single-axle trailer. The elevating sub-structure **2200** is assembled on a conventional leaf spring assembly **S** of the trailer **2000**. The leaf spring assembly **S** is mounted on the axle **A** and is normally connected to a trailer bed side rail **2120** of the trailer **2000** at respective ends of the spring assembly **S1** and **S2**. The sub-structure **2200** according to the invention is mounted on the spring ends **S1** and **S2** of the leaf spring assembly **S** and connects to the side rail **2120**. It is understood that the elevating sub-structure **2200** is assembled on the leaf spring assembly **S** on each side of the body **110** of the dump trailer **100**. The trailer bed side rail **2120** has a groove (not shown) that runs along a portion of the inside of the rail and a series of locking holes **2124** along another portion of the rail **2120**. The elevation sub-structure **2200** comprises an arrangement of bars that are pivotably connected to each other by a conventional pivot means, generally referred to as **2232** and are swingable between a deployed state and a collapsed state, shown in **FIGS. 12** and **13**. The bars include a front swing arm **2210F**, a rear swing arm **2210R**, a horizontal bar **2240**, an extension bar **2220**, and a slide arm **2230**. A front end of the horizontal bar **2240** is pivotably connected to the spring end **S2** and a lower end of the extension bar **2220** to

the spring end **S1**. The upper end of the extension bar **2220** is pivotably connected to the rear end of the horizontal bar **2240**. The length of the horizontal bar **2240** is approximately equal to the distance between the spring ends **S1,S2** when they are connected in a conventional manner to the underside of the trailer body **110**. The front swing arm **2210F** and the rear swing arm **2210R** are each connected at their respective lower ends to the horizontal bar **2240** and at their respective upper ends to a pivot connection **2232** that are at fixed points on the side rail **2120**. The lower end of the slide bar **2230** is pivotably connected to the spring end **S2** and has an upper end **2231** that is slidingly captured in a groove **2236** in a capture rail **2234** that is mounted alongside the side rail **2120**. The elevation sub-structure **2200** may be locked into the deployed state by aligned the forward end of the slide arm **2230** at the desired locking hole **2124** and inserting a pin through the respective locking hole **2124** and a through-hole in the upper end of the slide arm **2230**.

[0049] Deployment of the elevation sub-structure **2200** uses the power of the tow vehicle **T** to bring the trailer body **110** into a tilted position. The wheels **W** are prevented from rolling backward by placing a wheel chock or otherwise locking the wheels, the tow bar assembly **200** attached to the tow vehicle **T**, and the tow vehicle **T** backed toward the front end **F** of the trailer body **110** until the rear end **R** of the trailer body **110** is forced against the ground. With the rear end of the trailer body **110** resting on the ground, the weight of the trailer body **110** is lifted from the wheels **W** and the slide arm **2230** of the elevation sub-structure **2200** may be easily slid in the groove **2236** of the capture rail **2234** until a through-hole in the slide arm **2230** aligns with a desired one of the locking holes **2124** in the side rail **2120**. The capture rail **2234** is best seen in **FIG. 16**. The locking pin is the insertable through the locking hole **2124** and the through-bore to secure the slide arm **2230** in the desired position, holding the elevation sub-structure **2200** in a deployed state. When the dump maneuver is completed, the locking pin is removed. Now, when the tow vehicle **T** moves forward, it pulls elevation sub-structure

2200 into the collapsed state and the trailer body **110** is again in its nomal horizontal orientation.

[0050] It is understood that the embodiments described herein are merely illustrative of the present invention. Variations in the construction of the trailer, the tow bar assembly, and the elevation sub-structure may be contemplated by one skilled in the art without limiting the intended scope of the invention herein disclosed and as defined by the following claims.